

WESTON MAJOR PROGRAMS DIVISION  
HEALTH AND SAFETY PLAN  
EMERGENCY RESPONSE / SITE INVESTIGATION

TDD No. 9104-12

Site Name: Elizabeth Coal Gas

Site Address: Street No. 466 South Street

City ELIZABETH

County/State UNION County, New Jersey

Site Contact / Phone No.: \_\_\_\_\_

Directions to Site: (Att. Map) NJ TP NORTH to BAYWAY WEST  
To Route 1 North Exit off Rt 1  
to Grove Street + (square) MAKE LEFT  
onto 4th Ave Right onto High Street

Historical/Current Site Information:

FROM 1855-1901, the site was used to produce  
COAL GAS. AS A RESULT WASTE WAS PRODUCED  
due to gasification processes. Previous site  
study indicates high levels of PAHs are present  
in the soil. Currently the site (2 acres) is divided into  
2 sections: the North an active salvage area.  
and the South a public access base ball field

Incident Type:

☐ Air Release

☐ Spill - \_\_\_\_\_

☐ Fire - \_\_\_\_\_

☒ HW Site - ASSESSMENT AND SAMPLING

Location Class : ☒ Industrial ☒ Commercial ☒ Urban/Residential ☐ Rural

USEPA Contact: ELIZABETH Date of Initial Site Activities: 4/19/91

Original HASP: Yes ☒ Modification Number: \_\_\_\_\_

Lead TAT: M. Edwards Site Health & Safety Coordinator: PAUL POTVIN

Response Activities/Duration (fill in as applicable)

Emergency Response:

☐ Perimeter Recon. \_\_\_\_\_

☐ Site Entry \_\_\_\_\_

☐ Visual Documentation: \_\_\_\_\_

☐ Multi-media Sampling: \_\_\_\_\_

☐ Decontamination: \_\_\_\_\_

Assessment:

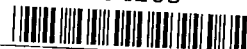
☒ Perimeter Recon. MEASUREMENT

☒ Site Entry LEVEL

☒ Visual Documentation: Sketch of site

☒ Multi-media Sampling: Soil/Water

☐ Decontamination: \_\_\_\_\_



Bob M.

received

5/10/91

4 Jan. 91 from Bob Manty.  
For your review & comments.  
c/4/91  
OK as basic "action H&SP" but  
for future committed, budgeted efforts  
full plan w/ budget/ thanks,  
RJ. Ed  
P.S. just write on the H&S Plan!

## Physical Safety Hazards to Personnel

- ( ) Heat (☒) Cold ( ) Precipitation ( ) Confined Space (☒) Terrain
- (☒) Walking/Working Surfaces ( ) Fire & Explosion ( ) Oxygen Deficiency
- ( ) Underground Utilities ( ) Overhead Utilities ( ) Heavy Equipment
- ( ) Unknowns in Drums, Tanks, Containers ( ) Ponds, Lagoons, Impoundments
- (☒) Rivers, Streams ( ) Pressurized Containers, Systems ( ) Noise
- ( ) Illumination ( ) Nonionizing Radiation ( ) Ionizing Radiation

## Biological Hazards to Personnel

- ( ) Infectious/Medical/Hospital Waste ( ) Non-domesticated Animals (☒) <sup>\*</sup>Insects
- (☒) Poisonous Plants/Vegetation ( ) Raw Sewage

*\* Special care should be taken to avoid infestation of ticks*

## Training Requirements

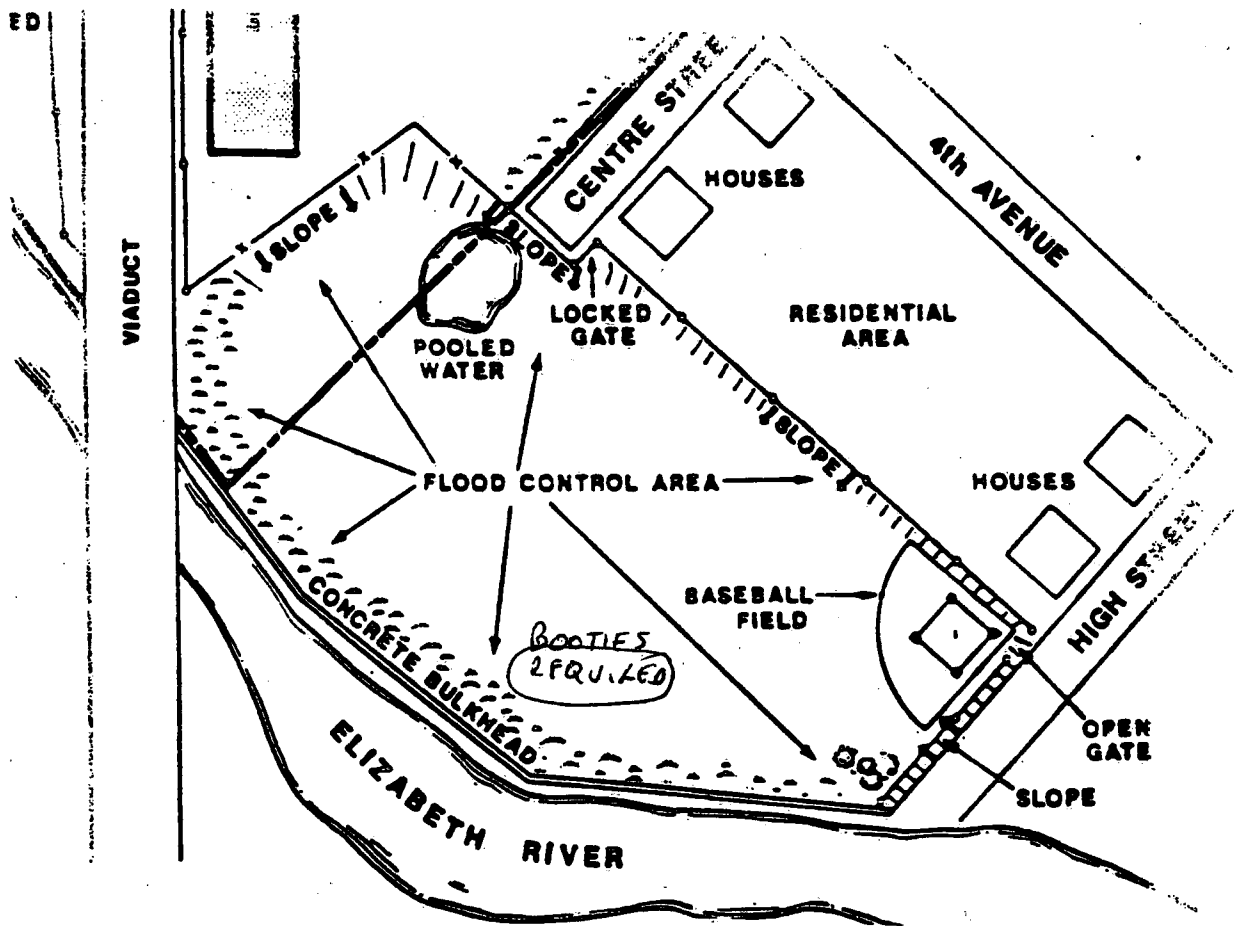
- ( ) 40 Hour General Site Worker Course with three days supervised experience.
- (☒) 24 Hour Course for limited, specific tasks with one day supervised experience.
- ( ) 24 Hour Course for Level D Site with one day supervised experience.
- (☒) 8 Hour Annual Refresher Health and Safety Training.
- ( ) 8 Hour Management/Supervisor Training in addition to basic training course.
- ( ) Site Specific Health and Safety Training.
- (☒) Pre-entry training for emergency response skilled support personnel.

## Medical Surveillance Requirements

- (☒) Baseline initial physical examination with physician certification.
- (☒) Annual medical examination with physician certification.
- ( ) Site Specific medical monitoring protocol (Radiation, Pesticide, PCB, Metals).
- ( ) Asbestos Worker medical protocol.
- ( ) Exempt from medical surveillance: \_\_\_\_\_.
- ( ) Examination required in event of chemical exposure or trauma.

Physical Parameters	Chemical Contaminant	Chemical Contaminant	Chemical Contaminant	Chemical Contaminant
	BENZENE	Toluene	NAPHTHALENE	Pyrene
Exposure Limits IDLH Level	0.5 ppm mg/m <sup>3</sup> PEL 10 ppm 30 mg/m <sup>3</sup> TLV 50 ppm mg/m <sup>3</sup> IDLH	200 ppm mg/m <sup>3</sup> PEL 100 ppm mg/m <sup>3</sup> TLV ppm mg/m <sup>3</sup> IDLH	10 ppm 50 mg/m <sup>3</sup> PEL 10 ppm 50 mg/m <sup>3</sup> TLV 100 ppm mg/m <sup>3</sup> IDLH	ppm 0.2 mg/m <sup>3</sup> PEL ppm mg/m <sup>3</sup> TLV ppm mg/m <sup>3</sup> IDLH
Physical Form Sol., Liq., Gas Color	Solid <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Gas <input type="checkbox"/> <del>ten</del> color	Solid <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Gas <input type="checkbox"/> <del>clear</del> color	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid Gas <input type="checkbox"/> color	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid Gas <input type="checkbox"/> <del>TLV</del> color <del>yellow</del>
Odor	AROMATIC	AROMATIC	COAL	
Flash Point Flammable Limits	<del>11</del> Degrees F or C <del>2.1</del> % UEL <del>13</del> % LEL	<del>4</del> Degrees F or C <del>1.1</del> % UEL <del>1.3</del> % LEL	<del>79</del> Degrees F or C <del>5.9</del> % UEL <del>0.9</del> % LEL	Degrees F or C % UEL % LEL
Vapor Press. Vapor Dens.	<del>27</del> mm/Hg 27 Air = 1	22 mm/Hg 3.14 Air = 1	0.08 mm/Hg 4.14 Air = 1	6.85x10 <sup>-7</sup> mm/Hg Air = 1
Specific Gravity	.87 Water = 1	0.866 Water = 1	1.162 Water = 1	1.271 Water = 1
Solubility	slight	slight (0.05%)	insoluble	insoluble
Incompatible Materials	several see MSDS	several see MSDS	strong oxidizing agents see MSDS	
Route of Exposure	<input checked="" type="checkbox"/> Inh <input checked="" type="checkbox"/> Abs <input type="checkbox"/> Con <input checked="" type="checkbox"/> Ing	<input checked="" type="checkbox"/> Inh <input type="checkbox"/> Abs <input type="checkbox"/> Con <input type="checkbox"/> Ing	<input checked="" type="checkbox"/> Inh <input type="checkbox"/> Abs <input checked="" type="checkbox"/> Con <input type="checkbox"/> Ing	<input checked="" type="checkbox"/> Inh <input type="checkbox"/> Abs <input type="checkbox"/> Con <input checked="" type="checkbox"/> Ing
Symptoms of Acute Exposure	Headache Weakness Lassitude	Fatigue Weakness Confusion	Corrosion Headache Loss of Appetite	Conjunctivae Irritation Nose Irritation
First Aid Treatment	Flush with Water	if SKIN contact flush w/ water	seek prompt medical assistance	Fresh Air if inhaled. Water or milk if <del>ingested</del>
Ion Potential	9.25 eV	8.82 eV	8.12 eV	? eV
Instruments For Detection	<input checked="" type="checkbox"/> PID w/ <input type="checkbox"/> Probe <input checked="" type="checkbox"/> FID <input type="checkbox"/> CGI <input type="checkbox"/> RAD <input type="checkbox"/> Det Tube <input type="checkbox"/> Ph Other	<input checked="" type="checkbox"/> PID w/ <input type="checkbox"/> Probe <input type="checkbox"/> FID <input type="checkbox"/> CGI <input type="checkbox"/> RAD <input type="checkbox"/> Det Tube <input type="checkbox"/> Ph Other	<input checked="" type="checkbox"/> PID w/ <input type="checkbox"/> Probe <input checked="" type="checkbox"/> FID <input type="checkbox"/> CGI <input type="checkbox"/> RAD <input type="checkbox"/> Det Tube <input type="checkbox"/> Ph Other	<input checked="" type="checkbox"/> PID w/ <input type="checkbox"/> Probe <input type="checkbox"/> FID <input type="checkbox"/> CGI <input type="checkbox"/> RAD <input type="checkbox"/> Det Tube <input type="checkbox"/> Ph Other

Site Map with work zones:



Decontamination Procedures

- ( ) Wet Decontamination - using: \_\_\_\_\_  
 (X) Dry Decontamination

Description of Site Specific Decontamination

Plan: DISPOSAL OF BOOTS AND TYRES  
NO RESPIRATORY PROTECTION REQUIRED  
MUST WEAR HARD HATS

Adequacy of decontamination determined by: \_\_\_\_\_

# Protective Equipment

TASK TO BE PERFORMED/AIR MONITORING REQUIRED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE OUTER GLOVE BOOT COVER	TYPE OF APR CARTRIDGE OR CANISTER
Measure Site	D	none	none	none
Sample Surface Soil Background	D	none	none	none

Frequency and Types of Air Monitoring: ( ) Continuous ( ) Routine - (X) Periodic -

DIRECT READING INSTRUMENTS	COMBUSTIBLE GAS/OXYGEN METER (1)	RADIATION SURVEY METER/PROBE (2)	PHOTOIONIZATION DETECTOR/PROBE (3) <i>HNU</i>	FLAME IONIZATION DETECTOR (4)	CHEM. DETECTOR TUBE (5)
ID NUMBER			<i>TIP</i>		
CAL. DATE			<i>4-18-91</i>		
TAT MEMBER			<i>MM</i>		
ACTION LEVEL	≥ 20%LEL ≤ 19.5%, ≥ 23% O <sub>2</sub> - LEAVE	3X BACKGRND - CAUTION; 1 MR/HR-LEAVE	UNKNOWN 0-5 UNITS: "C" 5-500: "B"	UNKNOWN 0-5 UNITS: "C" 5-500: "B"	PEL/TLV COMPARE W/PF

# Phone Numbers

Emergency Contact	Location	Phone Number	Notified
Hospital	JACQUES STELIZABETH	558 8050	
Ambulance	ELIZABETH	558 8050	
Police	↓ ↓	558 2000	
Fire Dept.	↓ ↓	820 8200	

Chemical Trauma Capability? ( ) Yes (X) No If no, closest backup: Police Phone: 558-2000

Directions to Hospital (attach map) - Route verified by: Michael Edwards Date: 1/1/  
HIGH STREET to 3rd Ave. Left onto 3rd Ave. Right turn at  
Yield sign onto Spring St. Continue to DARTS (LANDMARK)  
ON RIGHT HAND SIDE AT LIGHT. Make right at light  
onto East Jones Street. Hospital on left

Contact	Phone Number
WESTON 24 hr. Hotline	215-524-1925 215-524-1926
WESTON Medical Emergency Service	513-421-3063
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-942-5969

HASP prepared by: Michael Edwards Date: 4/1/81

Pre-Response/Entry Approval by: [Signature] Date: 4/1/81

Verbal Approval/Modification to Original HASP by: [Signature] Date: 1/1/

# Description of Site and Response Activities

Size of Site: 1 acre ? Terrain basin Weather Fair → 1/2  
 Distance to Nearest: Residence 50 ft School 1 mile Hospital 1 mile → Ch. out by a dry run!  
 Public Building 1/2 mile Other Other  
 Evacuation: ( ) Yes (x) No By Whom: \_\_\_\_\_  
 Nearest Waterway: Elizabeth River Distance from Site: 100 ft → 50'

Condition	Observed	Potential	None	Comments/Observations
Surface Water Contamination	X			
Ground Water Contamination			X	located at North end of Site based upon NUS' (SIA) dated 17 Sept. 90.
Drinking Water Contamination			X	
Air Release		X		Semi VOA has been determined by NUS
Soil Contamination	X			has been determined by previous study conducted by NUS
Stressed Vegetation			X	
Dead Animal Species			X	

## Actions Taken On-Site:

Perimeter Monitoring: (x) Yes ( ) No  
 Site Entry by TAT: (x) Yes ( ) No

Tasks Conducted	Level of Protection/Specific PPE Used
Air monitoring by Photo ionization Detector	Level D / Rubber Boots and Syngloves
measured perimeter of site and fencing where applicable	" " "



# Spring Summary Log

Date: 4/19/91

Data Collected by:

Michael Mentzel

- Data to be summarized by a "Range of readings, i.e., - Low to High" and/or "Average" by location.

Station/Location	CGI/O <sub>2</sub> Meter	Radiation Meter	PID/Probe	FID/OVA	Detector Tube
N/A	N/A	N/A	No Reading		

Summary/Comments:

Off Site: ( ☒ ) Yes ( ) No  
On Site: ( ☒ ) Yes ( ) No



Describe types of samples and methods used to obtain samples: Soil / Metal Scoop

Was Laboratory notified of Potential Hazard Level Of Samples? ( ☒ ) Yes ( ) No

**Note:** The nature of the work assignment may require the use of the following procedures/programs which will be included as Attachments to this HASP as applicable: Emergency Response Plan, Confined Space Entry Procedures, Spill Containment Program.

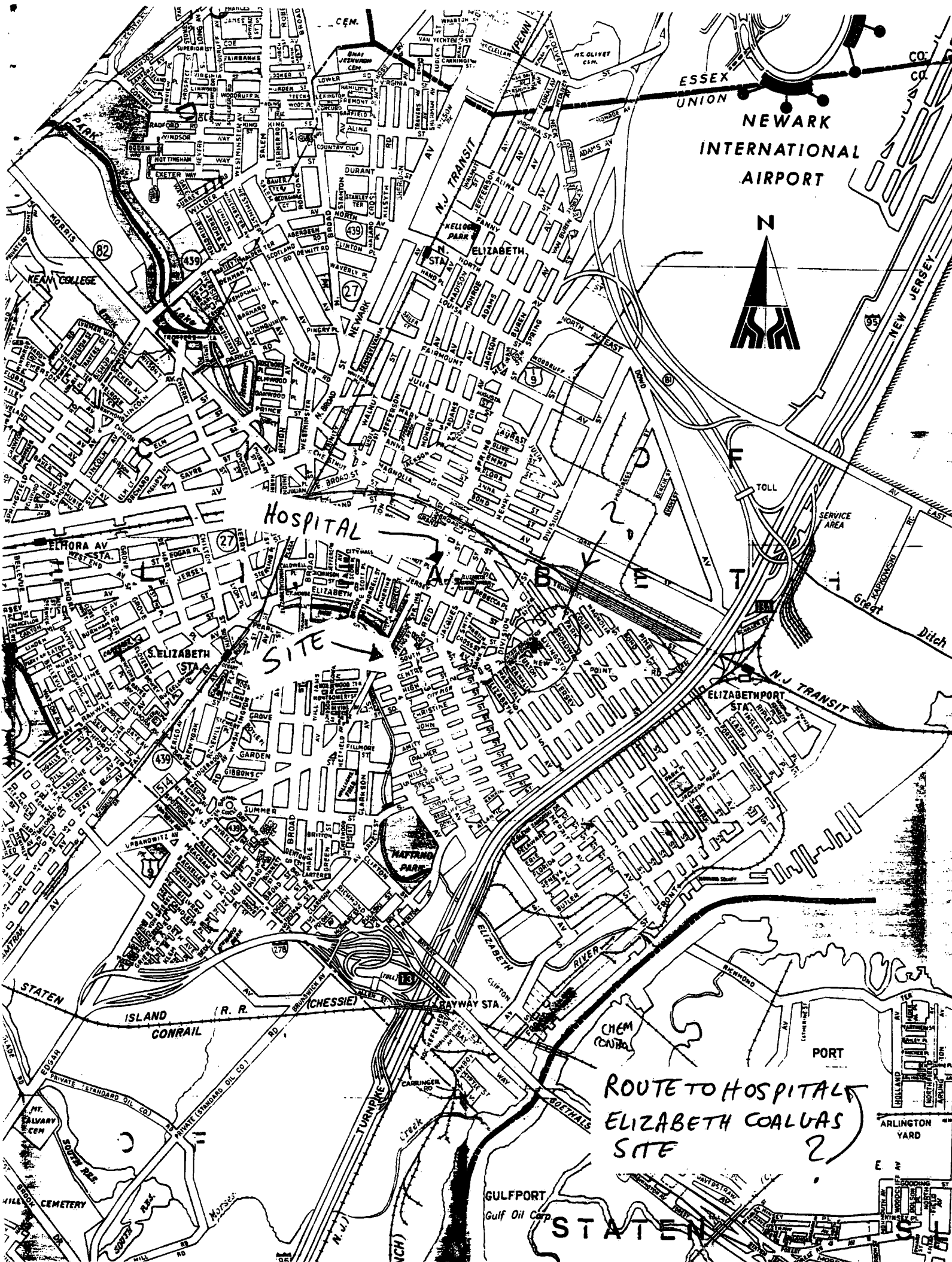
**Disclaimer:** This Health and Safety Plan (HASP) was prepared for work to be conducted under the Technical Assistance Team (TAT) Contract 68-WO-0036 for Zone I. Use of this HASP by WESTON and its subcontractor is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
MICHAEL MENTZEL		TAT-2	4/18/91
Michael Edwards		TAT-2	4/18/91

Final Submission of HASP by:		Date
Post Response Review by:		
Post Response Approval by:		
TAT HSO Review by:		

COMMENTS/FOLLOWUP



NEWARK  
INTERNATIONAL  
AIRPORT

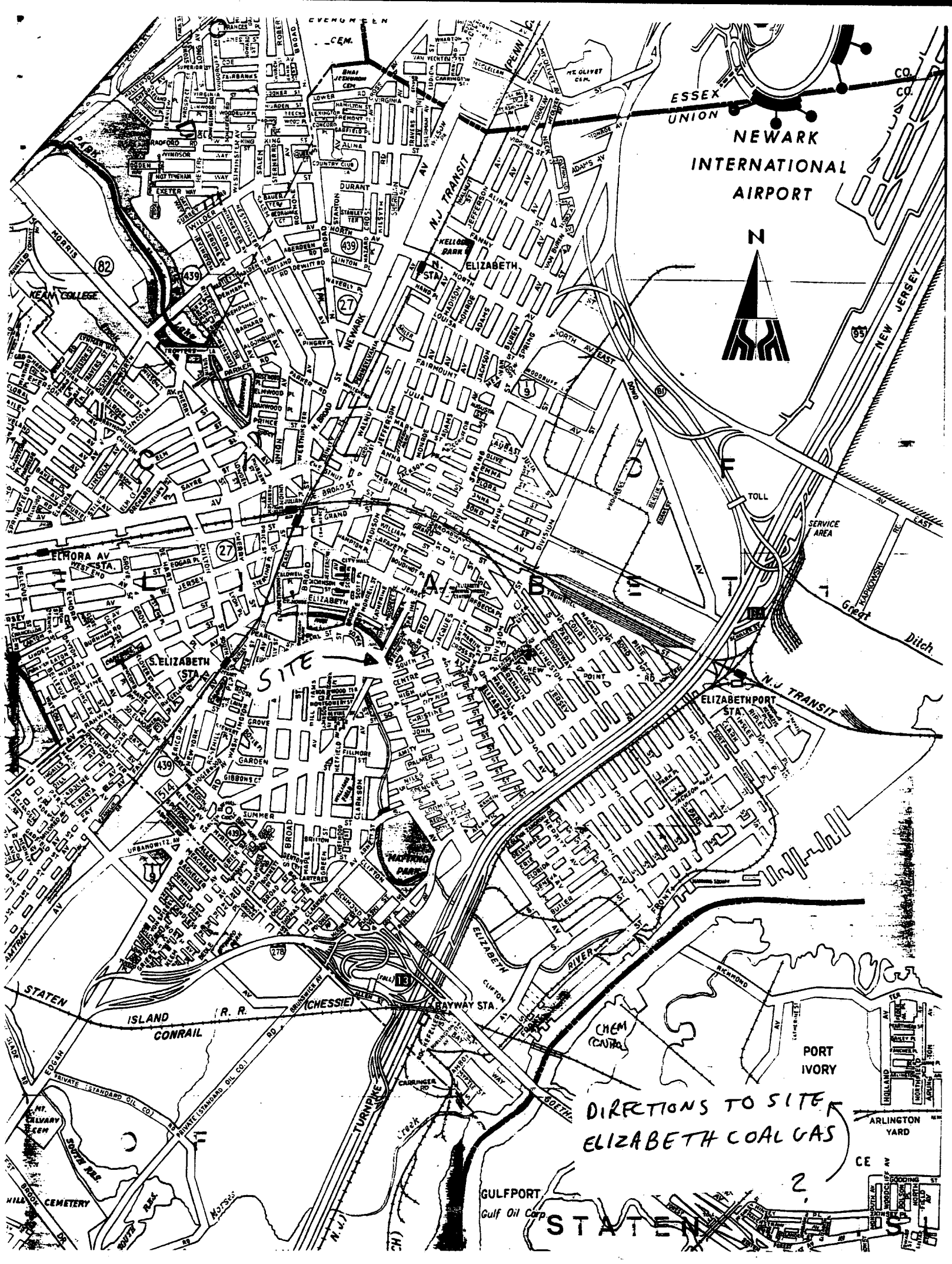


HOSPITAL

SITE →

ROUTE TO HOSPITAL  
ELIZABETH COALUAS  
SITE ?

STATEN



NEWARK  
INTERNATIONAL  
AIRPORT



SITE

DIRECTIONS TO SITE  
ELIZABETH COAL GAS

2

# Material Safety Data Sheet

From Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



GENIUM PUBLISHING CORP.

No. 316

**BENZENE**  
(Revision D)  
Issued: November 1978  
Revised: April 1988

25

## SECTION 1. MATERIAL IDENTIFICATION

Material Name: **BENZENE**

Description (Origin/Uses): Used in the manufacture of medicinal chemicals, dyes, linoleum, airplane dopes, varnishes, and lacquers; and as a solvent for waxes, resins, and oils.

Other Designations: Benzol; Phene; Phenylhydride;  $C_6H_6$ ; NIOSH RTECS No. CY1400000;  
CAS No. 0071-43-2

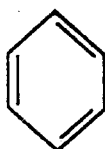
Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS  
H 2  
F 3 R 1  
R 0 I 4  
PPG\* S 2  
\*See sect. 8 K 4



## SECTION 2. INGREDIENTS AND HAZARDS

Benzene, CAS No. 0071-43-2



\*See NIOSH, RTECS, for additional data with references to irritative, mutagenic, tumorigenic, and reproductive effects.

## EXPOSURE LIMITS

Ca 100 OSHA PEL

8-Hr TWA: 1 ppm  
15-Min Ceiling: 5 ppm  
Action Level: 0.5 ppm

ACGIH TLV, 1987-88  
TLV-TWA: 10 ppm, 30 mg/m<sup>3</sup>

Toxicity Data\*  
Human, Inhalation, LC<sub>50</sub>: 2000 ppm/5 Min  
Human, Oral, TD<sub>01</sub>: 130 mg/kg  
Human, Inhalation, TC<sub>01</sub>: 210 ppm

## SECTION 3. PHYSICAL DATA

Boiling Point: 176°F (80°C)  
Melting Point: 42°F (5.5°C)  
Vapor Pressure: 75 Torrs at 68°F (20°C)  
Vapor Density (Air = 1): >1

Water Solubility (%): Slight  
% Volatile by Volume: 100  
Molecular Weight: 78 Grams/Mole  
Specific Gravity ( $H_2O = 1$ ): 0.87865 at 68°F (20°C)

Appearance and Odor: A colorless liquid; characteristic aromatic odor.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air
12°F (-11.1°C) CC	928°F (498°C)	% by Volume

1.3% 7.1%

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to put out benzene fires. Water may be ineffective as an extinguishing agent because it can scatter and spread the fire. Use water to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.

Unusual Fire or Explosion Hazards: Benzene vapor is heavier than air and can collect in low-lying areas such as sumps or wells. Eliminate all sources of ignition there to prevent a dangerous flashback to the original liquid benzene. Danger: Explosive and flammable benzene vapor-air mixtures can easily form at room temperature; always use this material in a way that minimizes dispersion of its vapor into general work areas.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Benzene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous chemical reactions involving benzene and the following materials are reported in Genium reference 84: bromine pentafluoride, chlorine, chlorine trifluoride, chromic anhydride, nitryl perchlorate, oxygen, ozone, perchlorates, perchloryl fluoride and aluminum chloride, permanganates and sulfuric acid, potassium peroxide, silver perchlorate, and sodium peroxide.

Conditions to Avoid: Avoid all exposure to sources of ignition and to incompatible chemicals.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide (CO) may be produced during benzene fires.

**SECTION 6. HEALTH HAZARD INFORMATION**

Benzene is listed as a suspected human carcinogen by the ACGIH.

**Summary of Risks:** Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure.

**Medical Conditions Aggravated by Long-Term Exposure:** Ailments of the heart, lungs, liver, kidneys, blood, and central nervous system (CNS) may be worsened by exposure. Administer preplacement and periodic medical exams emphasizing these organs' functions and reassign workers who test positive. **Target Organs:** Blood, CNS, bone marrow, eyes, and upper respiratory tract (URT). **Primary Entry:** Skin contact, inhalation. **Acute Effects:** Dizziness, mental dullness, nausea, headache, fatigue, and giddiness. **Chronic Effects:** Possible cancer (leukemia).

**FIRST AID**

**Eyes:** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.

**Skin:** Immediately wash the affected area with soap and water.

**Inhalation:** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.

**Ingestion:** Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting because of the possibility of aspiration.

**GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES.** Seek prompt medical assistance for further treatment, observation, and support after first aid.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

**Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations for disposal. Follow Federal, state, and local regulations.

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U019

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg)

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. **Respirator:** Wear a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent any possibility of skin contact with this suspected human carcinogen. **Ventilation:** Install and operate general and local ventilation systems powerful enough to maintain airborne levels of benzene below the OSHA PEL standard cited in section 2.

**Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in use and handling areas. **Contaminated**

**Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale benzene vapor!

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store benzene in a cool, dry, well-ventilated area away from sources of ignition and incompatible chemicals.

**Special Handling/Storage:** Protect containers from physical damage. Electrically ground and bond all metal containers used in shipping or transferring operations. Follow all parts of 29 CFR 1910.1028.

**Engineering Controls:** All engineering systems (production, transportation, etc.) must be of maximum explosion-proof design (non-sparking, electrically grounded and bonded, etc.)

**Comments:** If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if it is absolutely essential.

**Transportation Data (49 CFR 172.101-2)**

**DOT Shipping Name:** Benzene

**DOT Class:** Flammable Liquid

**DOT Label:** Flammable Liquid

**DOT ID No.** UN1114

**IMO Label:** Flammable Liquid

**IMO Class:** 3.2

**References:** 1, 2, 12, 73, 84-94, 100, 103.

Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, Genium Publishing Corp. extends no warranties, makes no representations and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

# Material Safety Data Sheet

Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



No. 317  
TOLUENE  
(Revision D)

Issued: August 1979  
Revised: April 1986

## SECTION 1. MATERIAL IDENTIFICATION

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**MATERIAL NAME:** TOLUENE

**OTHER DESIGNATIONS:** Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C<sub>7</sub>H<sub>8</sub>, CAS #0108-88-3

**MANUFACTURER/SUPPLIER:** Available from many suppliers, including:  
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400  
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219,  
Columbus, OH; Telephone: (614) 889-3844

HMIS

H: 2

F: 3

R: 0

PPE\*

\*See sect. 8



R 1

I 3

S 2

K 4

## SECTION 2. INGREDIENTS AND HAZARDS

%

### HAZARD DATA

Toluene

CH<sub>3</sub>



ca 100

8-hr TLV: 100 ppm, or  
375 mg/m<sup>3</sup>\* (Skin)\*\*

Man, Inhalation, TCLO:  
100 ppm: Psychotropic\*\*\*

Rat, Oral, LD<sub>50</sub>: 5000 mg/kg

Rat, Inhalation, LCLO:

4000 ppm/4 hrs.

Rabbit, Skin, LD<sub>50</sub>: 14 gm/kg

Human, Eye: 300 ppm

\* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

\*\* Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

\*\*\* Affects the mind.

## SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)

Vapor Pressure @ 20°C, mm Hg ... 22

Water Solubility @ 20°C, wt. % ... 0.05

Vapor Density (Air = 1) ... 3.14

Evaporation Rate (BuAc = 1) ... 2.24

Specific Gravity (H<sub>2</sub>O = 1) ... 0.866

Melting Point ... -139°F (-95°C)

Percent Volatile by Volume ... ca 100

Molecular Weight ... 92.15

**Appearance and odor:** Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method

Autoignition Temp.

Flammability Limits In Air

40°F (4°C) CC

896°F (480°C)

% by Volume

1.27

7.1

**EXTINGUISHING MEDIA:** Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

**UNUSUAL FIRE/EXPLOSION HAZARDS:** This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

## SECTION 5. REACTIVITY DATA

**CHEMICAL INCOMPATIBILITIES:** Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetroxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

**CONDITIONS TO AVOID:** Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.



**SECTION 6. HEALTH HAZARD INFORMATION | TLV**

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. **SUMMARY OF RISKS:** Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. **FIRST AID: EYE CONTACT:** Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.\* **SKIN CONTACT:** Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.\* **INHALATION:** Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.\* **INGESTION:** Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. \* **GET MEDICAL ASSISTANCE** = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**SPILL/LEAK:** Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). **WASTE DISPOSAL:** Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. **COMMENTS:** Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

**SECTION 8. SPECIAL PROTECTION INFORMATION**

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 fpm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm. Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**STORAGE SEGREGATION:** Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. **SPECIAL HANDLING/STORAGE:** Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. **ENGINEERING CONTROLS:** Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene. **COMMENTS:** Emptied containers contain product residues. Handle accordingly! Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294. Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 34, 81, 82. CR

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Approvals *JO. Accardo, 11/86.*

Indust. Hygiene/Safety *JW 12-86*

Medical Review *[Signature] Oct 86*



# Material Safety Data Sheet

From Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



No. 624

NAPHTHALENE

Issued: November 1987

## SECTION 1. MATERIAL IDENTIFICATION

24

Material Name: **NAPHTHALENE**

Description (Origin/Uses): Used as a moth repellant and in many industrial processes.

Other Designations: Naphthalin; Naphthene; Tar Camphor;  $C_{10}H_8$ ;  
NIOSH RTECS No. QJ0525000; CAS No. 0091-20-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the  
*Chemicalweek Buyer's Guide* (Genium ref. 73) for a list of suppliers.

HMIS

H 2

F 2

R 0

PPG\*

\*See sect. 8

R 1

I 4

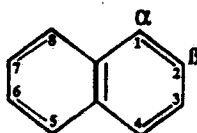
S 1

K 2



## SECTION 2. INGREDIENTS AND HAZARDS

Naphthalene, CAS No. 0091-20-3



\*Immediately dangerous to life and health

\*\*See NIOSH RTECS for additional data with references to irritative, mutagenic, reproductive, and tumorigenic effects.

ca 100

## EXPOSURE LIMITS

IDLH\* Level: 500 ppm

ACGIH TLVs, 1987-88

TLV-TWA: 10 ppm, 50 mg/m<sup>3</sup>

OSHA PEL

8-Hr TWA: 10 ppm, 50 mg/m<sup>3</sup>

Toxicity Data\*\*

Child, Oral, LD<sub>50</sub>: 100 mg/kg

Man, Unknown, LD<sub>50</sub>: 74 mg/kg

Rat, Oral, LD<sub>50</sub>: 1250 mg/kg

## SECTION 3. PHYSICAL DATA

Boiling Point: 424°F (218°C)

Vapor Density (Air = 1): 4.4

Vapor Pressure: 0.087 Torr at 77°F (25°C)

Water Solubility: Insoluble

Specific Gravity ( $H_2O = 1$ ): 1.162 at 68°F (20°C)

Melting Point: 176°F (80°C)

Molecular Weight: 128 Grams/Mole

% Volatile by Volume: ca 100

Appearance and Odor: White crystalline flakes; strong coal tar odor.

## SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

174°F (79°C) OC; 190°F (88°C) CC

979°F (526°C)

% by Volume

LOWER

UPPER

0.9

5.9

Extinguishing Media: Use water spray, dry chemical, or carbon dioxide to fight fires involving naphthalene. Caution: Foam or direct water spray applied to molten naphthalene may cause extensive foaming.

Unusual Fire or Explosion Hazards: Naphthalene is a volatile solid that gives off flammable vapor when heated (as in fire situations). This vapor is much denser than air and will collect in enclosed or low-lying areas like sumps. In these areas an explosive air-vapor mixture may form, and extra caution is required to prevent any ignition sources from starting an explosion or fire.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Naphthalene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Naphthalene is incompatible with strong oxidizing agents, chromic anhydride, and mixtures of aluminum trichloride and benzoyl chloride.

Conditions to Avoid: Ignition sources like open flame, unprotected heaters, excessive heat, lighted tobacco products, and electric sparks must not occur in work areas where naphthalene vapor may become concentrated.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide are produced during fire conditions. Irritating, flammable vapor forms below the melting point because even solid naphthalene has a significant vapor pressure.

**SECTION 6. HEALTH HAZARD INFORMATION**

Naphthalene is not listed as a carcinogen by the NTP, IARC, or OSHA.

**Summary of Risks:** Renal shutdown (kidney failure), hemolytic effects (breakdown of red blood cells), hematuria (blood in the urine), oliguria (low volume of urine), jaundice, eye damage, and depression of the central nervous system (CNS) are the primary health concerns associated with exposure to naphthalene. The ACGIH TLVs in section 2 are set to prevent eye damage. These recommended exposure limits may not be low enough to prevent blood changes in genetically hypersensitive individuals.

**Medical Conditions Aggravated by Long-Term Exposure:** Diseases of the blood, liver, and kidneys. Administer medical exams emphasizing these organs. **Target Organs:** Eyes, skin, kidneys, liver, blood (red blood cell effects), and CNS.

**Primary Entry:** Inhalation, skin contact. **Acute Effects:** Inhalation of naphthalene vapor causes excitement, confusion, headache, nausea, and loss of appetite. **Chronic Effects:** Increased incidence of cataracts.

**FIRST AID**

**Eye Contact:** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes to remove particles.

**Skin Contact:** Immediately wash the affected area with soap and water.

**Inhalation:** Remove victim to fresh air; restore and/or support his breathing as needed.

**Ingestion:** Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. Administer a gastric lavage followed by saline catharsis. Monitor blood and electrolytic balance. Other sources recommend giving the victim several glasses of water to drink.

**GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.**

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, provide ventilation, and eliminate all ignition sources immediately. Cleanup personnel need protection against contact and inhalation of vapor (see sect. 8). Contain large spills and collect waste. Use nonsparking tools to place naphthalene into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

**Waste Disposal:** Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000, Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U165

CERCLA Hazardous Substance, Reportable Quantity: 100 lbs (45.4 kg)

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Follow the eye- and face-protection guidelines of 29 CFR 1910.133. **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Respirator usage must be in accordance with the OSHA regulations of 29 CFR 1910.134. IDLH or unknown concentrations require an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres.

**Other Equipment:** Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment to prevent skin contact. **Ventilation:** Install and operate general and local maximum explosion-proof ventilation systems of sufficient power to maintain airborne levels of naphthalene below the OSHA PEL standard cited in section 2. **Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove and launder contaminated clothing before wearing it again; clean this material from shoes and equipment.

**Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep this material off of your clothing and equipment. Avoid transferring this material from hands to mouth while eating, drinking, or smoking. Do *not* smoke, eat, or drink in any immediate work area. Avoid inhalation of vapor!

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage Segregation:** Store naphthalene in a cool, dry, well-ventilated area away from chemical incompatibles (see sect. 5).

**Special Handling/Storage:** Protect containers from physical damage. All bulk storage facilities must be built with an explosion-proof design. All containers used in shipping/transferring operations must be electrically grounded to prevent static sparks. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.

**Comments:** All operations with naphthalene must be done carefully to prevent accidental ignition of its flammable/explosive vapor. If the weather is warm, more naphthalene vapor forms and the potential for explosion increases. Do *not* smoke in any use or storage area!

**Transportation Data (49 CFR 172.101-2)**

**DOT Shipping Name:** Naphthalene

**DOT Hazard Class:** ORM-A

**IMO Class:** 4.1

**DOT ID No.** UN1334

**IMO Label:** Flammable Solid

**DOT Label:** None

**References:** 1, 2, 12, 73, 84-94, 103. PJI

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**Approvals** *[Signature]*

**Indust. Hygiene/Safety** *[Signature]*

**Medical Review** *[Signature]*

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**Material Safety Data Sheets Collection:**

Sheet No. 711

**Pyrene**

Issued: 4/90

**Section 1. Material Identification**

31

**Pyrene Description:** A condensed ring, polyaromatic hydrocarbon compound derived from coal tar. Also synthesized from o,o'-ditolyl. Used in biochemical research and as starting material for synthesizing benzo(a)pyrene. An ingredient of smoked and broiled meat, tobacco smoke, and air pollution.

**Other Designations:** CAS No. 0129-00-0; C<sub>16</sub>H<sub>10</sub>; beta-pyrene; benzo(d,e,f)phenanthrene; benzo(d,e,f)phenanthrene.

**Manufacturer:** Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*<sup>(7)</sup> for a suppliers list.

R 1  
I 3  
S 2\*  
K -  
\* Skin absorption



HMIS  
H 2  
F 1  
R 0  
PPG†  
† Sec. 8

**Section 2. Ingredients and Occupational Exposure Limits**

Pyrene, ca 100%

**OSHA PEL**8-hr TWA: 0.2 mg/m<sup>3</sup>**ACGIH TLV, 1989-90**

None established

**NIOSH REL, 1987**

None established

**Toxicity Data\***

Rat, oral, LD<sub>50</sub>: 2700 mg/kg ingested produces conjunctiva irritation, excitement, and muscle contraction

Rat, inhalation, LC<sub>50</sub>: 170 mg/m<sup>3</sup> inhaled produces conjunctiva irritation, excitement, and muscle contraction

Gene mutation in mammalian cells; human cell types: 12 µmol/l

\* See NIOSH, RTECS (UR2450000), for additional mutative, tumorigenic, and toxicity data.

**Section 3. Physical Data****Boiling Point:** 759 °F/404 °C**Melting Point:** 313 °F/156 °C**Vapor Pressure:** 6.85 x 10<sup>-7</sup> torr at 68 °F/20 °C**Molecular Weight:** 202.26 g/mol**Specific Gravity (H<sub>2</sub>O = 1 at 39 °F/4 °C):** 1.271 at 73 °F/23 °C**Water Solubility:** insoluble (0.135 mg/l)

**Appearance and Odor:** Colorless solid or a slight blue florescent solution. Tetracene impurities give pyrene a yellow color.

**Section 4. Fire and Explosion Data****Flash Point:** None reported**Autoignition Temperature:** None reported**LEL:** None reported**UEL:** None reported

**Extinguishing Media:** Use foam, dry chemical, and CO<sub>2</sub> to extinguish fire.

**Unusual Fire or Explosion Hazards:** Pyrene is a flammable and combustible material that heat and ignition sources may ignite. It burns rapidly with a flare-like effect.

**Special Fire-fighting Procedures:** Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Avoid skin contact. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

**Section 5. Reactivity Data**

**Stability/Polymerization:** Pyrene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

**Hazardous Products of Decomposition:** Thermal oxidative decomposition of pyrene can emit irritating fumes and acrid smoke.

**Section 6. Health Hazard Data**

**Carcinogenicity:** Neither the NTP, IARC, nor OSHA lists pyrene as a carcinogen.

**Summary of Risks:** Pyrene is irritating to exposed skin and eyes, moderately toxic by ingestion and intraperitoneal routes, and a poison by inhalation. Experimental studies show pyrene is a tumorigen in animals and a mutagen in humans. Workers exposed to concentrations between 3 and 5 mg/m<sup>3</sup> showed some unspecified teratogenic effects. In general, human exposure occurs mainly through inhalation of tobacco smoke and polluted air. Although ingesting smoked and broiled meats may expose humans to pyrene, there is little indication of serious health effects.

**Medical Conditions Aggravated by Long-Term Exposure:** None reported.

**Target Organs:** Skin, eyes, respiratory tract.

**Primary Entry Routes:** Inhalation, ingestion, skin contact.

**Acute Effects:** Vapor inhalation may irritate the nose mucosa and respiratory tract. Vapors may also cause conjunctival irritation. Pyrene is absorbed through intact skin and causes dermal irritation. Ingestion may irritate and burn the esophagus and gastrointestinal tract.

**Chronic Effects:** None reported.

**FIRST AID**

**Eyes:** Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.

**Skin:** *Quickly* remove contaminated clothing. After rinsing affected skin with flooding amounts of water, wash it with soap and water.

**Inhalation:** Remove exposed person to fresh air and support breathing as needed.

**Ingestion:** Never give anything by mouth to an unconscious or convulsing person. If ingested, have a *conscious* person drink 1 to 2 glasses of milk or water. Do not induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

**Physician's Note:** Observe patients with dermal exposure for systemic poisoning since pyrene is absorbed through intact skin.

**Section 7. Spill, Leak, and Disposal Procedures**

**Spill/Leak:** Notify safety personnel, evacuate all unnecessary personnel, and remove all heat and ignition sources. Cleanup personnel should protect against vapor inhalation and skin and eye contact. Scoop spilled material into appropriate disposal containers. Absorb liquid with inert, noncombustible material and place waste in appropriate disposal containers. Follow applicable OSHA regulations (29 CFR 1910.120).

**Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**EPA Designations**

**RCRA Hazardous Waste (40 CFR 261.33):** Not listed

Listed as a CERCLA Hazardous Substance\* (40 CFR 302.4), Reportable Quantity (RQ): 5000 lb (2270 kg) [\* per Clean Water Act, Sec. 307(a)]

Listed as SARA Extremely Hazardous Substance (40 CFR 355), Reportable Quantity: 5000 lb, Threshold Planning Quantity (TPQ): 1000/10,000 lb

**SARA Toxic Chemical (40 CFR 372.65):** Not listed

**OSHA Designations**

**Air Contaminant (29 CFR 1910.1000, Subpart Z):** Not listed

**Section 8. Special Protection Data**

**Goggles:** Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

**Respirator:** Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

**Warning:** Air-purifying respirators do *not* protect workers in oxygen-deficient atmospheres.

**Other:** Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

**Ventilation:** Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2).

Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.<sup>(109)</sup>

**Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

**Contaminated Equipment:** Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

**Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

**Section 9. Special Precautions and Comments**

**Storage Requirements:** Store in closed containers in a cool, well-ventilated area. Protect containers from physical damage.

**Engineering Controls:** Avoid vapor inhalation and skin contact. Practice good personal hygiene and housekeeping procedures. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations in production and storage areas. Provide preplacement and periodic medical examinations, including comprehensive medical histories with emphasis on the oral cavity, respiratory tract, bladder, and kidneys. Examine the skin for premalignant and malignant lesions.

**Transportation Data (49 CFR 172.101, .102):** Not listed

**MSDS Collection References:** 7, 73, 87, 103, 123, 124, 126, 127, 136

**Prepared by:** MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: MJ Hardies, MD

# Material Safety Data Sheet

From Genium's Reference Collection  
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GENIUM PUBLISHING CORP.

No. 318

XYLENE (Mixed Isomers)  
(Revision D)  
Issued: November 1980  
Revised: August 1988

## SECTION 1. MATERIAL IDENTIFICATION

26

Material Name: XYLENE (Mixed Isomers)

Description (Origin/Uses): Used as a raw material for the production of benzoic acid, phthalic anhydride, isophthalic and terephthalic acids and their dimethyl esters in the manufacture of polyester fibers; in sterilizing catgut; with Canadian balsam as oil-immersion in microscopy; and as a cleaning agent in microscopic techniques.

Other Designations: Dimethylbenzene; Xylol;  $C_6H_4$ ; CAS No. 1330-20-7

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek*

Buyers' Guide (Genium ref. 73) for a list of suppliers.

Comments: Although there are three different isomers of xylene (*ortho*, *meta*, and *para*), the health and physical hazards of all three isomers are very similar. This MSDS is written for a xylene mixture of all three isomers, which is usually commercial xylene.



NFPA

HMIS

H 2

F 3

R 0

PPG\*

\*See sect. 8

R 1

I 3

S 2

K 3

## SECTION 2. INGREDIENTS AND HAZARDS

%

### EXPOSURE LIMITS

Xylene (Mixed Isomers), CAS No. 1330-20-7\*

\*o-Xylene, CAS No. 0095-47-6

m-Xylene, CAS No. 0108-38-3

p-Xylene, CAS No. 0106-42-3

\*\*Check with your supplier to determine if there are additions, contaminants, or impurities (such as benzene) that are present in reportable quantities per 29 CFR 1910.

\*\*\*Immediately dangerous to life and health.

\*\*\*\* See NIOSH, RTECS (No. ZE2100000), for additional data with references to reproductive, irritative, and mutagenic effects.

IDLH\*\*\* Level: 1000 ppm

OSHA PEL

8-Hr TWA: 100 ppm, 435 mg/m<sup>3</sup>

ACGIH TLVs, 1987-88

TLV-TWA: 100 ppm, 435 mg/m<sup>3</sup>

TLV-STEL: 150 ppm, 655 mg/m<sup>3</sup>

Toxicity Data\*\*\*\*

Human, Inhalation, TC<sub>50</sub>: 200 ppm

Man, Inhalation, LC<sub>50</sub>: 10000 ppm/6 Hrs

Rat, Oral, LD<sub>50</sub>: 4300 mg/kg

## SECTION 3. PHYSICAL DATA

Boiling Point: 275°F to 293°F (135°C to 145°C)\*

Melting Point: -13°F (-25°C)

Evaporation Rate: 0.6 Relative to BuAc = 1

Specific Gravity (H<sub>2</sub>O = 1): 0.86

Water Solubility (%): Insoluble

Molecular Weight: 106 Grams/Mole

% Volatile by Volume: Ca 100

Vapor Pressure: 7 to 9 Torrs at 68°F (20°C)

Vapor Density (Air = 1): 3.7

Appearance and Odor: A clear liquid; aromatic hydrocarbon odor.

\*Materials with wider and narrower boiling ranges are commercially available.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

81°F to 90°F (27°C to 32°C)

867°F (464°C)

% by Volume

1%

7%

Extinguishing Media: Use foam, dry chemical, or carbon dioxide. Use water sprays to reduce the rate of burning and to cool containers.

Unusual Fire or Explosion Hazards: Xylene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Xylene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: This material may react dangerously with strong oxidizers.

Conditions to Avoid: Avoid any exposure to sources of ignition and to strong oxidizers.

Hazardous Products of Decomposition: Carbon monoxide (CO) may be evolved during xylene fires.

**SECTION 6. HEALTH HAZARD INFORMATION**

Xylene is not listed as a carcinogen by the IARC, NTP, or OSHA.

**Summary of Risks:** Liquid xylene is a skin irritant and causes erythema, dryness, and defatting; prolonged contact may cause blistering. Inhaling xylene can depress the central nervous system (CNS), and ingesting it can result in gastrointestinal disturbance; and possibly hematemesis (vomiting blood). Effects on the eyes, kidneys, liver, lungs, and the CNS are also reported. **Medical Conditions Aggravated by Long-Term Exposure:** Problems with eyes, skin, central nervous system, kidneys, and liver may be worsened by exposure to xylene. **Target Organs:** CNS, eyes, gastrointestinal tract, blood, liver, kidneys, skin. **Primary Entry:** Inhalation, skin contact/absorption. **Acute Effects:** Dizziness; excitement; drowsiness; incoordination; staggering gait; irritation of eyes, nose, and throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; and dermatitis. **Chronic Effects:** Reversible eye damage, headache, loss of appetite, nervousness, pale skin, and skin rash.

**FIRST AID:** **Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. **Skin.** Immediately wash the affected area with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have a trained person administer oxygen. **Ingestion.** Never give anything by mouth to someone who is unconscious or convulsing. Vomiting may occur spontaneously, but do not induce it. If vomiting should occur, keep exposed person's head below his or her hips to prevent aspiration (breathing the liquid xylene into the lungs). Severe hemorrhagic pneumonitis with grave, possibly fatal, pulmonary injury can occur from aspirating very small quantities of xylene.

**GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES.** Seek prompt medical assistance for further treatment, observation, and support after first aid. If exposure is severe, hospitalization for at least 72 hours with careful monitoring for delayed onset of pulmonary edema is recommended.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of xylene vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

**Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U239

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), section 311 (b) (9)

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specifics of the work operation to prevent prolonged or repeated skin contact with xylene. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of xylene below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of xylene into general work areas by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make eyewash stations, safety/quick-drench showers, and washing facilities available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean xylene from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale xylene vapor.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store xylene in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage.

**Special Handling/Storage:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, producing, and sampling operations.

**Transportation Data (49 CFR 172.101-2)**

**DOT Shipping Name:** Xylene

**DOT ID No.** UN1307

**DOT Label:** Flammable Liquid

**DOT Hazard Class:** Flammable Liquid

**IMO Label:** Flammable Liquid

**IMO Class:** 3.2 or 3.3

**References:** 1, 2, 12, 73, 84-94, 100, 103.

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